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L3: (136349) cathode or cathodes  
L4: (219080) electrode or electrodes  
L5: (315679) 12 or 13 or 14  
L6: (168429) float or floats or floated or floating  
L7: (5620) buoy or buoys or buoyed or buoyancy or buoyancy  
L8: (22711) buoyant or buoyance or buoyancy  
L9: (178979) 16 or 17 or 18  
L10: (2878) 15 nears 19  
L11: (24) 11 and 110

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B2: (136349) cathode or cathodes  
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Text: Page: 1 of 1

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L4: Entry 1 of 1

File: DWPI

Oct 26, 2000

DERWENT-ACC-NO: 2001-015745

DERWENT-WEEK: 200241

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**TITLE:** Purification device for running water has floating elements arranged before and behind and left and right of anode on water surface with cathode plate on running water bed opposite to anode

**INVENTOR:** FUJITA, K; MAEKAWA, T

**PATENT-ASSIGNEE:**

ASSIGNEE	CODE
JAPAN SCI & TECHNOLOGY CORP	NISCN
KAGAKU GIJUTSU SHINKO JIGYODAN	KAGAN

**PRIORITY-DATA:** 1999JP-0110911 (April 19, 1999)

**PATENT-FAMILY:**

PUB-NO	PUB-DATE	LANGUAGE	PAGES	MAIN-IPC
WO 200063123 A1	October 26, 2000	J	027	C02F001/46
JP 2001000979 A	January 9, 2001		007	C02F001/48
EP 1112966 A1	July 4, 2001	E	000	C02F001/46
CN 1302278 A	July 4, 2001		000	C02F001/46

**DESIGNATED-STATES:** CN US AT BE CH CY DE DK ES FI FR GB GR IE IT LU MC NL PT SE AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU MC NL PT SE

**APPLICATION-DATA:**

PUB-NO	APPL-DATE	APPL-NO	DESCRIPTOR
WO 200063123A1	April 19, 2000	<u>2000WO-JP02541</u>	
JP2001000979A	April 19, 2000	2000JP-0118650	
EP 1112966A1	April 19, 2000	2000EP-0917360	
EP 1112966A1	April 19, 2000	<u>2000WO-JP02541</u>	
EP 1112966A1		WO 200063123	Based on
CN 1302278A	April 19, 2000	2000CN-0800619	

**INT-CL (IPC):** B01 D 53/86; B01 D 53/94; C02 F 1/46; C02 F 1/48

**ABSTRACTED-PUB-NO:** WO 200063123A

**BASIC-ABSTRACT:**

**NOVELTY -** Purification device for running water has a cathode plate arranged on the running water bed and a anode plate arranged on the top surface opposite to the cathode. Floating elements are arranged before and after and left and right of the running water flow direction of the anode plate so the anode plate sinks under the running water surface.

**DETAILED DESCRIPTION** - A positioning means is arranged on the anode means to maintain the upper surface position opposite to the cathode. An electric field generating mechanism is positioned on the anode and the cathode plates and water polluting substances contained in the running water are oxidatively decomposed by a high electric field pulse.

An INDEPENDENT CLAIM is also included for the running water purification treatment using this device.

**USE** - Used to remove water polluting substances such as nitrogen and phosphorus from running water.

**ADVANTAGE** - The purification of a flow of running water is possible at high efficiency and workably.

**DESCRIPTION OF DRAWING(S)** - The figure shows a section drawing of purification device.

Conductive Porous Metal A

Oxide Electrode, Platinum Electrode B

Gas Collector C

Seal Plate D

Cathode Plate E ^

Floating Element F

Turbulent Flow Generating Plate G

Movable Sides h

Differential Transformer I

Gas Collection Pump P

Flow Meter V

Turbidity Meter Tu

Control Device CPU

Electric Field Generator PA

CHOSEN-DRAWING: Dwg.1/5

**TITLE-TERMS:** PURIFICATION DEVICE RUN WATER FLOAT ELEMENT ARRANGE LEFT RIGHT ANODE WATER SURFACE CATHODE PLATE RUN WATER BED OPPOSED ANODE

**DERWENT-CLASS:** D15 J03 X25

**CPI-CODES:** D04-A01M; D04-B07B; D04-B07C; J03-B;

**EPI-CODES:** X25-H03;

**UNLINKED-DERWENT-REGISTRY-NUMBERS:** 1531U; 1925U ; 1927U ; 1966U

**SECONDARY-ACC-NO:**

CPI Secondary Accession Numbers: C2001-004188

Non-CPI Secondary Accession Numbers: N2001-011959

5/2003

ESI - Default ESI Workspace [Flat Panel LANDSCAPE.wsp]

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Drafts  Pending  Active

- L1: (883) (205/742-761) . CCLS.
- L2: (25007) flights
- L3: (31) 11 and 12
- L4: (96232) anode or anodes
- L5: (1136202) cathode or cathodes
- L6: (303308) electrode or electrodes
- L7: (381654) 14 or 15 or 16
- L8: (794) 12 same 17
- L9: (12) 11 and 18

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U	I	P	T	P	Document ID	Issue Date	Pages	Title	Current CR	Current Xref	Retrieval C	Inventor	S	C	B	I
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	Document ID	Pages
1	US 6556527 B2	8
2	US 6506929 B1	7
3	US 5935412 A	6
4	US 4915845 A	6
5	US 4755305 A	17
6	US 4624436 A	15
7	US 443290 A	7

US-PAT-NR:

4755305

DOCUMENT-IDENTIFIER: US 4755305 A

TITLE: Continuous dewatering method

----- RWTIC -----

Detailed Description Text - DEIX (5):  
 An exemplary electrode module M is shown in FIG. 2 and includes five electrode support floats 100, 102, 104, 106, and 108 that are secured in a spaced parallel relationship to one another by end plates 110 and 112. In the preferred embodiment, the electrode support floats 100-108 and the end plates 110 and 112 are fabricated from construction grade wood members with the floats, as shown in detail in FIGS. 3 and 3A, fabricated from 1" times 8" times 16" boards 114 secured together about a styrofoam floatation block 116 with end caps 118 provided to seal the ends of each of the electrode support floats. The end plates 110 and 112 that secure the electrode support floats 100-108 together to complete each electrode module M are also preferably 2" times 8" times 16" boards. Accordingly, each electrode module M has 16" times 16" overall dimensions.

Detailed Description Text - DEXX (6):  
 The electrode supports 100, 104, 108 serve as supports for the anodes 120 as shown in further detail in FIG. 4, and the intermediate electrode support floats 102 and 106 serve as supports for the cathode assemblies 122 as shown in further detail in FIGS. 5-7.

Detailed Description Text - DEXX (7):  
 The electrode support floats 100, 104, and 108 each include four equi-spaced anodes 120. In the preferred form, each anode 120 is a schedule 40 carbon steel pipe (2" inside diameter) approximately 6' long and secured at its upper end by securing it to brackets 124, brackets, or the like, to the side of its respective float. An end cap 126 is located at the lower end of each anode 120 to seal the interior of the anode. As shown in FIG. 8, a threaded stud 128 is secured as by welding to the upper end of each anode 120 and serves as a terminal for connection to a power carrying wire 130. In FIG. 2, only the anodes 120 on the electrode support float 100 are shown connected by the conductor 130, it being understood that each of the anodes 120 on the two other electrode supports floats 104 and 108 are likewise interconnected by conductors 130 from the three anode conductors 100, 104, and 108 connected to a common anode conductor (not shown) that passes through the power cable 16 to the power supply 18 (FIG. 1).

Detailed Description Text - DEXX (8):  
 As shown in FIG. 2, the cathode assemblies 122 are secured to the electrode support floats 102 and 106 intermediate the anode support floats 100, 104, and 108. Each cathode assembly 122 is designed to both function as an electrode and as a filtrate removal device. Each cathode assembly 122 includes an outer filtration bag or sock 132 (see FIG. 7) in the form of a hollow, elongated woven fabric tube closed at its lower end and woven from, e.g., polyester or like material or fabricated from a non-woven material such as DuPont type.

United States Patent [19]		[11] Patent Number: 4,755,305
	Fremont et al.	[45] Date of Patent: Jul. 5, 1988
[34] CONTINUOUS DOWTERING METHOD		3,952,059 6/1976 Ioue et al.
[75] Inventor: Harry A. Fremont, Wyoming; William C. Dorenan, Hamilton, both of Ohio		3,988,658 12/1976 Fischer
[73] Assignee: Charon International Corporation, Stamford, Conn.		4,012,119 5/1977 Ramirez
[21] Appl. No.: 881,960		4,031,631 7/1977 Orca
[22] Filed: Apr. 11, 1986		4,043,047 8/1977 Galbier

## OTHER PUBLICATIONS

Excerpts from McGraw-Hill Encyclopedia of Science & Technology, PP. 196-170, 599-601, 314, 207, 23, 182, 583, 37, 104, 169, 534, 595, 505, 166, 194-195 and 542-544.  
(List continued on next page.)

Primary Examiner—Tom Wise

Attorney, Agent or Firm—Evelyn M. Sommer

## ABSTRACT

An apparatus and method for dewatering sludge and the like as part of landfill operations by electrokinetic techniques including placing anode and cathode electrodes in contact with the sludge and applying electrical energy to the electrodes to establish an electric field in the sludge. Charged particles within the sludge, including macromolecules, colloids, and suspended particles, electrophoretically migrate to the oppositely charged counter electrode and anode. A filtration module located at one of the electrodes permits the electro-kinetic removal of water from the sludge to encourage solids denitrification. The electrical energy applied to the electrodes is a chopped, time-varying, intermittent unidirectional current having a rapid rise which provides dewatering results comparable to prior methods that used direct current or full AC current but substantially reduced energy consumption to provide more economical dewatering. Presently preferred optimum conditions for practicing the invention are also disclosed, including means for applying the techniques of the disclosure to a continuous dewatering method and an apparatus for practicing that method. The application of the electrokinetic techniques to other processes such as electrolysis, including electrolysis (using a membrane or bipolar membrane), distillation or metathesis; and electromigration, including electrophoresis; and other electrokinetic processes is suggested.

Related U.S. Application Data  
[63] Continuation of Ser. No. 416,901, Sep. 13, 1982, abandoned, which is a continuation-in-part of Ser. No. 251,218, Apr. 6, 1981, Pat. No. 4,671,874, and a continuation-in-part of Ser. No. 358,002, Mar. 15, 1982.

[57] Primary Examiner—Tom Wise

Attorney, Agent or Firm—Evelyn M. Sommer

[57] Continuation of Ser. No. 210/748, 243, 204/149, 204/DIG. 9

[58] Field of Search 210/748, 243, 204/149, 204/DIG. 9

[59] U.S. PATENT DOCUMENTS

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3,770,402 1/1973

3,889,405 9/1979

3,915,422 10/1979

3,928,333 12/1979

3,959,088 5/1976

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3,770,401 1/1973

3,770,402 1/1973

3,889,405 9/1979

3,915,422 10/1979

3,928,333 12/1979

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3,770,401 1/1973

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3,915,422 10/1979

3,928,333 12/1979

3,959,088 5/1976

4,011,400

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Details HTML

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US - PAT - NO: 5935412  
DOCUMENT - IDENTIFIER: US 5935412 A  
TITLE: Method and apparatus for eliminating odors in sewage systems

**Abstract Text - ABIX (1):** A scrubber and method for precipitating a sulfide in water which contains hydrogen sulfide or a mercaptan. The scrubber includes a sacrificial first metal anode and a second metal cathode which are in physical and electrical contact and suspended into the water to form an electrolysis cell of the anode, cathode and the water; the second metal is more noble than the first metal. Preferably, the anode is iron and the cathode is stainless steel. When so constituted, the anode forms iron oxide which reacts with sulfur from the hydrogen sulfide or the mercaptan to form an iron sulfide precipitate. The anode and cathode may be coplanar and suspended in the water with a free-moving float which facilitates contact of the water with the anode, or may be rods.

which are tethered and twisted to form a twisted wire pair.

**Brief Summary Text - BSTX (7):**  
It is yet a further object of the present invention to provide a novel odor scrubber for precipitating a metal sulfide in water which contains hydrogen sulfide or a mercaptan in which the scrubber has a sacrificial metal anode and stainless steel cathode which are suspended into the water to form an electrolysis cell, and in which the anode and cathode are coplanar and suspended in the water with a float which facilitates contact of the water with the anode.

**Brief Summary Text - BSTRX (8):**  
It is still a further object of the present invention to provide a novel floating odor scrubber with a sacrificial metal anode and stainless steel cathode which are coplanar and suspended in the water with a float which may make the scrubber either positively buoyant, with the float on the water surface and anode and cathode suspended with the float beneath the surface of the water.

Detailed Description Text - DEX (4):  
 With reference now to FIG. 1, a scrubber 10 of a first embodiment may include an anode 12, a cathode 14 which may be planar (they are shown in side view in FIG. 1), and a float 16 for suspending anode 12 and cathode 14 in the water. Float 16 is preferably free-moving (that is, not in a fixed location) to facilitate relative movement between anode 12 and the water to promote the release of the anode metal over the surface of anode 12. A connective member 18 is used to provide a physical and an electrical connection between anode 12 and cathode 14. The anode and cathode are spaced apart a distance selected to control the rate of electrolysis.

Detailed Description Text = DENTX (5):

**United States Patent** [19] **Patent Number:** **5,935,412**  
**Brainard, II** **Date of Patent:** **Aug 10, 1999**

[54] METHOD AND APPARATUS FOR  
ELIMINATING ODORS IN SEWAGE  
SYSTEMS Inventor: Edward C. Brainerd, II, Marion,  
Mass.  
Assignee: Atlantis Limited Partnership, Marion,  
Mass.

[75] OTHER PUBLICATIONS By Nigel Calder, *Boatowner's Mechanical and Electrical  
Manual*, Second Edition, Page 133, no date available.  
"Waste water Treatment: Plant Odors and Control",  
*National Environmental Journal*, Jan/Feb 1986 — pp 29-31.

10 Claims. 2 Drawing Sheets  
tempered and twisted to form a twisted wire pre-

A technical line drawing of a vertical cylinder assembly. The main body is a rectangular block labeled 16 at the top. A horizontal line extends from its center through a central opening. On the left side, a bracket labeled 17 is attached to the body. On the right side, two parallel vertical rods labeled 12 extend downwards from the body. A horizontal rod labeled 14 connects the two vertical rods. A U-shaped bracket labeled 19 is positioned between the vertical rods, with its base resting on the horizontal rod 14. A small circular component labeled 18 is located at the junction where the vertical rods meet the horizontal rod 14.

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Document ID	V Pages	S	U	C	P	Kind Codes	Solid content
9 US 5935412 A	6	□	□	□	□	USPAT	9%
10 US 5755384 A	38	□	□	□	□	USPAT	9%
11 US 5746920 A	17	□	□	□	□	USPAT	9%
12 US 5630934 A	10	□	□	□	□	USPAT	9%
13 US 5555310 A	37	□	□	□	□	USPAT	9%
14 US 5530334 A	14	□	□	□	□	USPAT	9%
15 US 5435893 A	8	□	□	□	□	USPAT	9%

US-PAT-NO: 5435893

DOCUMENT-IDENTIFIER: US 5435893 A

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TITLE: Process for the dewatering of phosphate slimes

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Detailed Description Text - DEXR (7):

Once the phosphate slime has been placed within the holding facility, the cathode is placed at the surface of the phosphate slime but below the surface of any supernatant water. In prior art processes for the electro-separation of clays in phosphate slimes, the cathode has been designed to float on the surface of the water but above the surface of the slime material. See, for example, U.S. Pat. No. 4,808,304. It has been discovered that when the cathode is located at the surface of the supernatant liquid, lower dewatering rates occur as well as higher energy consumption. This is principally because the conductivity of the slime is higher than that of the supernatant water itself. Further, lower solid contents are produced from the phosphate slimes when the process is used. Thus, it is critical to the process that the cathode be sunk through any decanted water layer and be placed at the interface between the water and the phosphate slime with the cathode actually touching the surface of the phosphate slime. Preferably, the cathode is a screen type material with openings of at least several millimeters square. Preferably the thickness of the screen is about 2 to 3 millimeters. The metal used for the most efficient dewatering of the phosphate slime. The metal used for the cathode can be of any conventional cathode material such as copper or steel with zinc coating. Preferably the screen is roll spread onto the surface of the slime material. The cathode is placed at the appropriate demarcation line between the supernatant liquid and the phosphate slime, a specific gravity adjuster is secured to the surface of the cathode to hold it in place. Any conventional mechanism can be utilized for this adjuster. In one embodiment, the specific gravity adjuster is made of hollow plastic or foam material which will adjust the specific gravity of the cathode to be between one and the specific gravity of the phosphate slime material so that the cathode can sink through the supernatant liquid but not significantly sink into the slime material, especially at the beginning of the electro-sedimentation process. The specific construction of the specific gravity adjuster is not particularly critical as long as it results in the combination hollow plastic and cathode having a specific gravity slightly greater than 1.0. As the cathode metal screen has a specific gravity of about 7 to 8 and the floating material made of foam or hollow plastic has specific gravity significantly less than 1, the combination of these two can be readily adjusted to create a combination having a specific gravity slightly greater than 1. The particular choice as to construction is not critical. However, what is critical is that the cathodes sink through the supernatant liquid to rest on or slightly below the surface of the phosphate slime material. When the solid content of the phosphate slime rises to a level of about 20% solid, the cathode will be supported by the phosphate slime itself. The weight of the cathode is generally sufficient itself to force the cathode to touch the surface of the phosphate slime. An example of the structure of the cathode is shown in FIGS. 2 and 2A.

## EXAMPLE 2

In this test, the same material was used as that in

Example 1. The method and test material were about the same as those in Example 1. The differences between Example 1 and Example 2 were the current density and processing time. In test 2, D.C. power of 2.3 V and 12.0 ma current with a half wave were used for 40 hours. The average current density was 0.26 mA/cm<sup>2</sup>. After 40 hour treatment, the weight of clay before and after dry was 44.1 gram and 12.6 gram, respectively. The final solid content of clays was 29% and total energy consumption was 48.8 KWH/ton dry basis.

clay: Florida Nonlyn primary weather clay, solid content 9%

test unit: 200 ml glass beaker

power: D.C. 2.4 V., half wave, 7.8 ma

test time: 98 hours

current density: 0.15 mA/cm<sup>2</sup>

dry weight: wet: 68.2 gram; dry: 18.9 gram

final solid content: 28%

energy consumption: 25.8 KWH/ton dry basis

## EXAMPLE 3

In this test, the same material was used as that in Example 1. The method and test material were about the same as those in Example 1. The differences between Example 1 and Example 2 were the current density and processing time. In test 2, D.C. power of 2.3 V and 12.0 ma current with a half wave were used for 40 hours. The average current density was 0.26 mA/cm<sup>2</sup>. After 40 hour treatment, the weight of clay before and after dry was 44.1 gram and 12.6 gram, respectively. The final solid content of clays was 29% and total energy consumption was 48.8 KWH/ton dry basis.

## EXAMPLE 4

In this example the method and the test material were the same as those in Example 3. In this test D.C. 10 V and 29 ma current with full-wave phase-controlled was applied to the clay. The average current density was 0.235 mA/cm<sup>2</sup>.

During the first 24 hour testing the cathode was kept in touch with the surface of clays and decanted water was drained manually. After 24 hour treatment, a few green clays were taken out to determine solid content at this time. The solid content after 24 hour treatment was 29% and energy consumption for 24 hours was \$7.0 KWH/ton dry basis. When the solid content reached 15 29%, a 3 mm in diameter hole was drilled on the side wall of the bottle above the anode. This hole made drainage automatic. After 24 more hour treatment, the clays were taken out. The clays were divided into two parts one was a core part and another was an annulus part. The solid content of core part, which was 46% of total wet clay weight, was 35%. The average solid content of clay including core and annulus was 34%.

clay: Florida IMC phosphatic clay, solid content 9%

test unit: plastic bottle, Diameter= 10.3 cm,

Height= 18.0 cm

power: D.C. 10.0 V., full wave smoothed, 29 ma

current density: 0.35 mA/cm<sup>2</sup>

test time:

24 hours solid content 29%

48 hours average solid content 33.8% solid content in the core of clay

energy consumption: 57.0 KWH/ton dry basis (up to 24 hours)

We claim:

1. A process for the in situ dewatering of phosphate slimes containing electroinsensitive clays contained in a settling pond comprising the steps of:

(a) placing an anode at the bottom of the settling pond for the storage of the phosphate slimes;

(b) filling the settling pond with electroinsensitive clays containing a solid portion of electroinsensitive clays;

(c) placing a cathode on the surface of the solid portion of phosphate slimes far below the surface of any supernatant liquid contained in said phosphate slimes;

(d) applying an electrical current to the cathode to produce a separation of the solid portion of the phosphate slimes;

(e) draining off any decanted water to produce dried phosphate slimes with a solid content of at least about 15 percent.

2. The process of claim 1 wherein the current applied to produce the phosphate slimes is a direct current.

3. The process of claim 2 wherein the current density of the current applied is from about 0.1 mA/cm<sup>2</sup> to about 1.0 mA/cm<sup>2</sup>.

4. The process of claim 3 wherein different current densities are used depending upon the type of clay contained within the phosphate slimes.

5. The process of claim 4 wherein the wave form for the current applied is adjusted, depending upon the nature of the clays contained within the phosphate slimes.

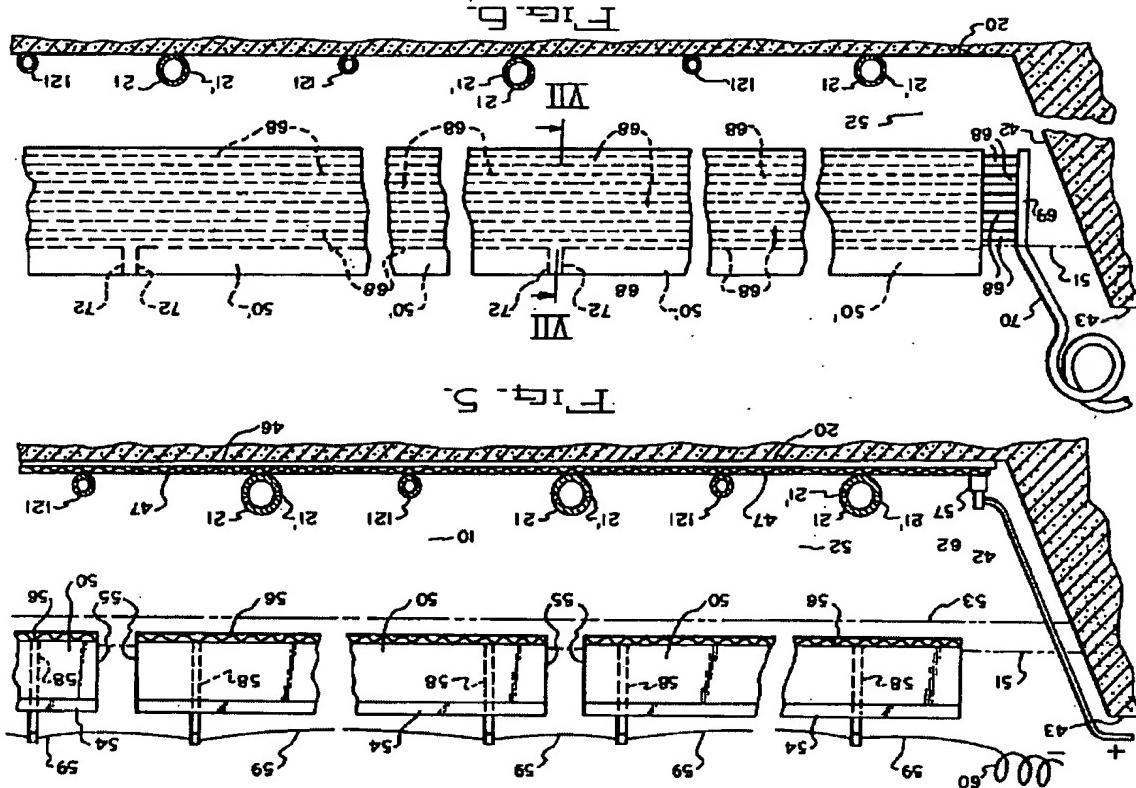
6/2003 00/710 854 111 from 514351893 in

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EASTI Browser - L12, {2} [{"4808304": "Y", ...}], US 4808304 A | Tag: S | Doc: 1/2 [S0R1LD] | Format: KWIC

US - PAT - NO: 4606304  
DOCUMENT - IDENTIFIER: US 4606304 A

U.S. Patent No. - PN (1):  
4808304



U.S. Patent Feb. 28, 1989 Sheet 3 of 4 4,808,304

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- L1: (865) (205/742-761).CCLS.
- L2: (96347) anode or anodes
- L3: (136349) cathode or cathodes
- L4: (303753) electrode or electrodes
- L5: (382185) 12 or 13 or 14
- L6: (175319) float or floats or floated or floating or flotation
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- L8: (22711) buoyant or buoyance or buoyancy
- L9: (185074) 16 or 17 or 18
- L10: (6115) 15 near5 19
- L11: (35) 1.1 and 110
- L12: (2) ((4808304") or ("4337136")) . PN.
- L13: (16176) 204/198-297-16.cc1s.
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- L16: (178) 114 not 111

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United States Patent [19]						
[11] 3,816,073						
[45] June 11, 1974						
<b>MILLER</b>						
[1] Document ID	[2] Pages	[3]	[4]	[5]	[6]	[7]
41 US 438832 A	4	□	□	□	□	□
42 US 3975256 A	7	□	□	□	□	□
43 US 3968216 A	7	□	□	□	□	□
44 US 3910831 A	5	□	□	□	□	□
45 US 3857764 A	7	□	□	□	□	□
46 US 3847787 A	19	□	□	□	□	□
47 US 3816073 A	4	□	□	□	□	□

US+PAT-No:

3816073

DOCUMENT-IDENTIFIER: US 3816073 A

TITLE: ODOR ELIMINATION SYSTEM

----- KWIC -----

US+PAT-No:

3816073

DOCUMENT-IDENTIFIER: US 3816073 A

TITLE: ODOR ELIMINATION SYSTEM

----- KWIC -----

[34] ODOR ELIMINATION SYSTEM

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Carmenza, La Quinta, Calif. 92253

Primary Examiner—Morris O. Wolk

Assistant Examiner—Date Lovercheck

Attorney, Agent, or Firm—Nilsson, Robbins &amp; Berliner

[41] June 11, 1974

[22] Filed: Dec. 1, 1972

[21] Appl. No.: 311,194

[35] ABSTRACT

An odor elimination system for a portable toilet. The

toilet

comprises a bowl member charged initially with

water to a predetermined level and having liquid and

solid wastes deposited therein. A pair of electrodes is

immersed in the water between the top and bottom of

the bowl. The lower electrode can be formed by cast-

ing a conductive layer on the bottom of the bowl.

Switching means connects the positive terminal of a

D.C. voltage source to the lower electrode and the

negative terminal to the upper electrode whereby oxy-

gen forms at the bottom electrode and rises to the top

of the water, oxidizing odors, bacteria, and algae

formed in the water.

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## 4 Drawing Figures

## Detailed Description Text - DENTX (8):

The electrodes 36 and 38 can be formed of any current conducting material which will not erode in the excreta-containing water. In the embodiment illustrated in FIGS. 2 and 3, the electrodes 36 and 38 are formed of sealed flexible vinyl tubing which is coated with graphite cemented on the surface thereof with a flexible epoxy. The upper electrode 38 is hollow so as to float on the top surface 34 of the reservoir water 32. The lower electrode 36 can be filled or otherwise weighted so that it sinks to the bottom of the bowl.

## Detailed Description Text - DENTX (9):

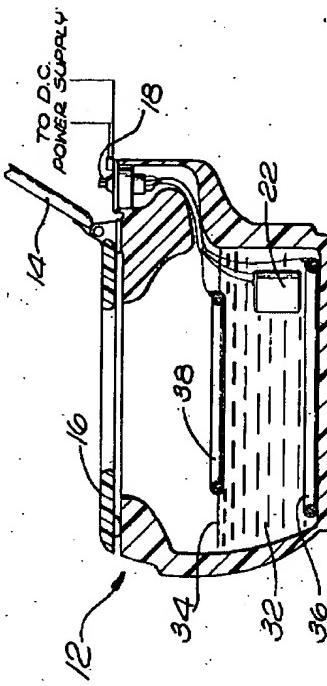
FIGS. 2 and 3 illustrate an odor elimination system which can be added to a conventional portable toilet. If it is desired to install the system during the manufacture of the toilet, a lower electrode 44, for connection to the positive terminal, can be coated with graphite and epoxy as shown in FIG. 4. Alternatively, gold or silver can be deposited on the lower surface of the bowl (e.g., by well known vacuum deposit techniques or by plating) and utilized as the lower electrode. The upper electrode can be coated on the bowl near but below the top of the initial water level, but it is preferred to float the upper electrode, as described with respect to FIGS. 2 and 3.

## Claims Text - CITEX (3):

a first electrode floating adjacent the top level of said water;

Current US Cross Reference Classification - CCXR (1):

204/280



U.S. Patent Jan. 21, 1986 Sheet 2 of 2 4,565,617

三國志

סוכנות תרבות

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Drawing Description Text - DRTX (8):  
 FIG. 6 shows in vertical cross section an alternative construction of the float of FIGS. 1, 2 and 3 wherein a skirt is provided around the entire float, which enables collection of the endo gases, such as oxygen or chlorine.

Current US Original Classification - CCR (1):  
204/228.2

Current US Cross Reference Classification - CCXR (2):  
204/229.2

Current US Cross Reference Classification - CCCR (3) :

Current US Cross Reference Classification - CCXR (4):  
209/278

Current US Cross Reference Classification - CCXR (6):  
204.11  
204.290.01

Current US Cross Reference Classification - CCXR (7) :  
2011/2020

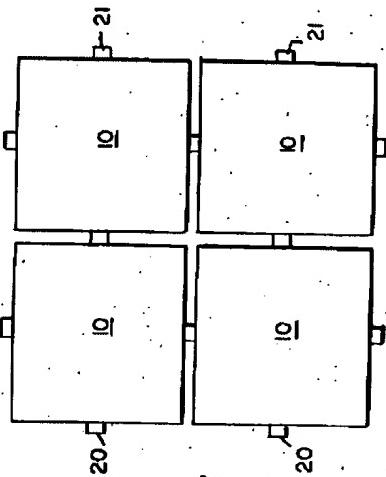


FIG. 4

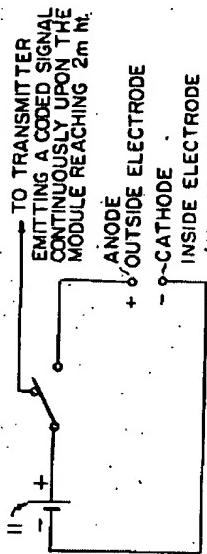


FIG. 5

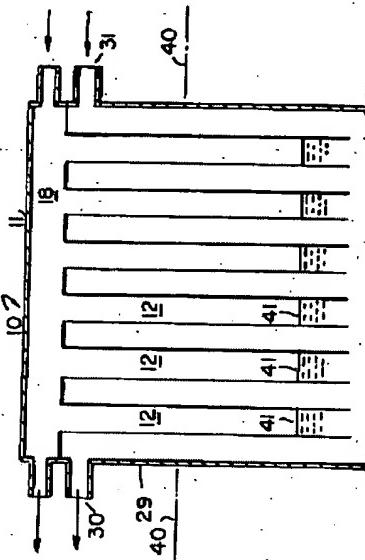


FIG. 6

6/2/2003 09/719,854 115

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L4: (219080) electrode or electrodes  
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L8: (22711) buoyant or buoyance or buoyancy  
L9: (178979) 16 or 17 or 18  
L10: (2878) 15 nears 19  
L11: (24) 11 and 110  
L12: (2) ("4808304") or ("4337136"). PN.  
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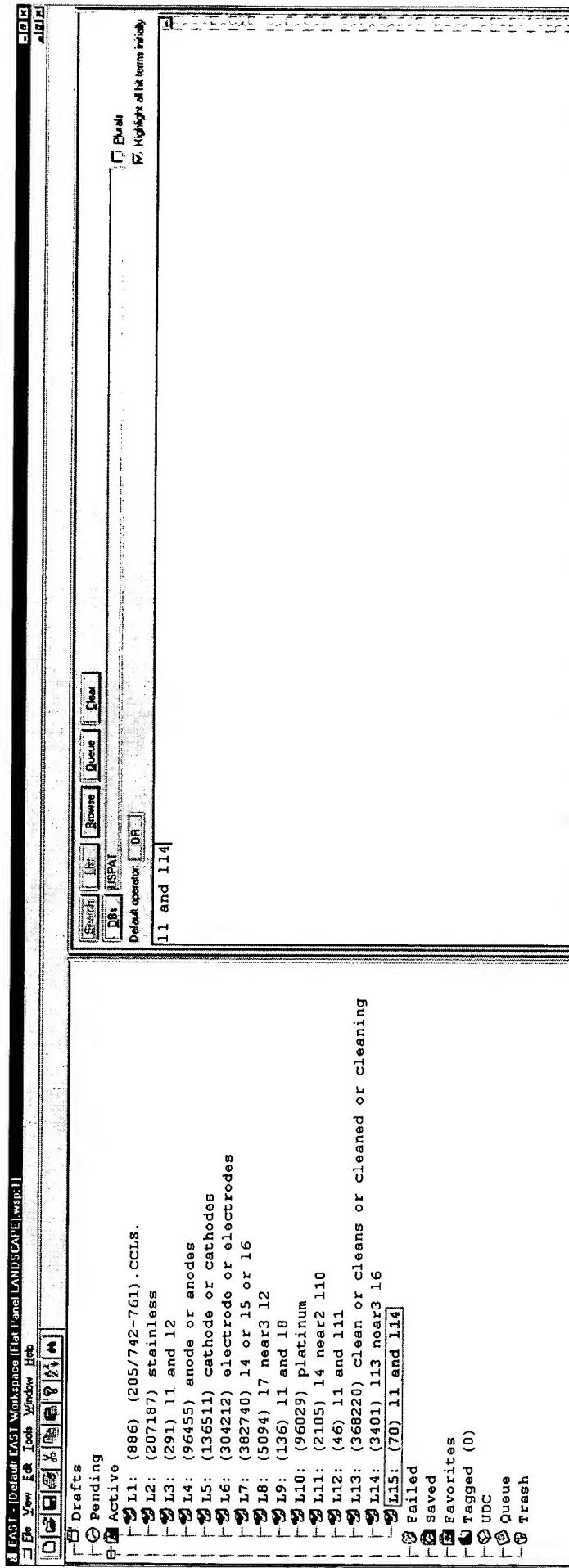
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1	☒	☐	☐	☐	US 6572902 B2	20030603	6	Process for producing improved alkaline drinking	426/66	204/228.3;			Abramowitz, Robert M. et al.	☐	☐	☐
2	☒	☐	☐	☐	US 6562243 B2	20030513	20	SYNERGISTIC COMBINATION OF METAL IONS WITH AN OXIDIZING	210/754	204/263;			Sherman, Jonathan	☐	☐	☐
3	☒	☐	☐	☐	US 6547951 B1	20030415	10	Method and apparatus for treatment of organic	205/688	210/169;			Maebara, Takaaki	☐	☐	☐
4	☒	☐	☐	☐	US 6468414 B1	20021022	16	Method of purification of a redox mediator before	205/688	204/275.1;			Mahdavi, Behzad et al.	☐	☐	☐
5	☒	☐	☐	☐	US 6391184 B1	20020521	38	Decontamination method and system, such as an in-situ	205/687	204/242;			Orolin, John J. et al.	☐	☐	☐
6	☒	☐	☐	☐	US 6332972 B1	20011225	18	Decontamination method and system, such as an in-situ	205/742	204/275.1;			Orolin, John J. et al.	☐	☐	☐
7	☒	☐	☐	☐	US 6287450 B1	20010911	14	Apparatus and method for purifying water with an	205/745	204/278;			Hedil, George	☐	☐	☐
8	☒	☐	☐	☐	US 6280637 B1	20010828	6	Treatment of liquid waste	210/748	204/242;			Eccles, Christopher	☐	☐	☐
9	☒	☐	☐	☐	US 6277265 B1	20010821	17	Apparatus and method for electrocoriolysis, the	205/687	204/248			Robert, Hanak, Joseph J.	☐	☐	☐
10	☒	☐	☐	☐	US 6270680 B1	20010807	41	Amperometric sensor probe for an automatic halogen	210/746	204/290.01;			silveri, Michael A. et al.	+	☐	☐
11	☒	☐	☐	☐	US 6264845 B1	20010724	18	Augmented electrolytic precipitation of metals,	210/748	204/555;			Higby, Loren P. et al.	☐	☐	☐
12	☒	☐	☐	☐	US 6258250 B1	20010710	7	Method to reduce or prevent scaling	205/742	205/742;			Weissenbacher, Andreas et al.	☐	☐	☐

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37 US 5587064 A		5	□	□	□	□	□	□	□	USPAT	
38 US 5569809 A		15	□	□	□	□	□	□	□	USPAT	
39 US 5569388 A		11	□	□	□	□	□	□	□	USPAT	
40 US 5519812 A		8	□	□	□	□	□	□	□	USPAT	
41 US 5545310 A		37	□	□	□	□	□	□	□	USPAT	
42 US 5587324 A		9	□	□	□	□	□	□	□	USPAT	
43 US 53716242 A		9	□	□	□	□	□	□	□	USPAT	

US-PAT-NC: 5569809  
 DOCUMENT-IDENTIFIER: US 5569809 A  
 TYPE: Method for destruction of chlorinated hydrocarbons  
 ----- RWIC -----

Detailed Description Text - DENTX (29):  
 Electrode surface deactivation due to surface contamination or polymerization is a common problem for organic electrolysis. However, it can be overcome through either mechanical cleaning or in-situ electrochemical cleaning. Mechanic cleaning can be done either by taking the electrode out to resurface it or by cleaning the electrode in the cell through a polishing device. Electrochemical cleaning is achieved through the either extreme oxidation or reduction depending on the nature of surface deactivation. Ultrasoundication have also been found to be effective to enhance the electrochemical cleaning. Compared in FIG. 5 are cyclic voltammograms of a deactivated (solid curve) and the reactivated Arcolex 1242 which had undergone some degree of electropoxygenation at -3.0 V. The electrode reactivation was accomplished by applying 1.46 V to the deactivated GC electrode for a few minutes. The oxidation potential and time are important to achieve clean, but reproducible active electrodes. Periodical potential stepping between cleaning oxidation and reduction is also effective. The advantages of electrochemical cleaning over the mechanical cleaning are simpler, faster, and reproducible.

Current US Cross Reference Classification - CCXR (2):  
 205/742

Current US Cross Reference Classification - CCXR (3):  
 205/743

## United States Patent [9]

Guil [11] Patent Number: 5,569,809  
 [51] Date of Patent: Oct. 29, 1996

5,591,270 2/1995 Gui et al. .... 204/153.1

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"Electrochemical Processing (Inorganic)", vol. 9, pp. 149-158 (no date)  
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 Primary Examiner—Armin S. Phang  
 Attorney, Agent, or Firm—Noreen C. Johnson; William H. Flitman

### ABSTRACT

A method for detecting and destroying various chlorinated hydrocarbons and unsaturated hydrocarbons in the environment using electrochemical techniques has been invented. By contacting the chlorinated hydrocarbons or unsaturated hydrocarbons in a solvent by liquid-solid or liquid-liquid extraction, and then passing current through the solvent extractant consisting the chlorinated hydrocarbons or unsaturated hydrocarbons electrochemically removes chlorine and oxidizes unsaturated hydrocarbons. The potential is measured to correlate to the concentration of the chlorinated hydrocarbon species.

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 [51] Int. Cl<sup>6</sup> ..... 001/0461  
 [52] U.S. Cl. ..... 588/204; 588/212; 205/688;  
 205/742; 205/779.5; 205/743  
 [58] Field of Search ..... 204/149, 153, 13,  
 204/131; 588/204, 212; 205/688, 742, 779.5,  
 743

### SW Electrochemistry for Chlorinated Ethylenes

